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ABSTRACT

Noting difficulties experienced by small to medium sized colleges in acquiring integrated library computer systems, this position paper outlines issues related to the subject with the intention of increasing familiarity and interest in integrated library systems. The report includes: a brief review of technological advances as they relate to library development; a chronology of current computer utilization within the Eastern Montana College Library; faculty and student perspectives on anticipated system benefits; general system standards and specifications; library system marketplace statistics; and cost-related issues. The paper was prepared as part of a campus-wide planning process and incorporates a current literature review. (Author/THC)

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An Integrated Library System: Preliminary Considerations

Eastern Montana College Library

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September, 1985

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The Future

It has been noted that a significant impediment to change is not love of the status quo but lack of a clear understanding of where technology leads. Prototypes help us visualize the actual utility of computer systems. The following scenario, originally developed by the Association of American Medical Colleges, describes some aspects of an integrated library system from a faculty perspective.

> All library records are accessible online. The records include inventory carried in branch libraries. Access to library materials may be obtained by visiting the library and browsing. The alternative is to "call-up" the library system from an office or home terminal - whatever the time or day of the week - to search and request information sources, verify the status of currently "checked-out" items, or request the addition or deletion of "reserve" items. Since inter-institutional agreements allow access to other "local" library collections, the resources available online are considerably larger than on-campus collections. National networks provide access to resources thousands of miles away.[1]

While this is not a reality here at Eastern it could be in the near future. Such systems are increasingly common in higher education.

Starting in 1981 with the installation of the library's first computer system through our association with the Western Library Network, automation efforts have expanded to include four separate systems. By-in-large, these systems are not suited for end-users; rather, they meet the technical requirements of the library. These computer-based operations have established a foundation for the introduction of the library's first system designed to meet both student and faculty requirements, while allowing concurrent technical processing.

Such an end-user integrated system will have multiple and far reaching impacts on our academic community. For this reason, it is important that the planning process involve a full range of the library's constituencies. This communication is a call for such a process. Background material is provided where possible.

Technology and Libraries

Knowledge, information and data have always been the lifeblood of academe. Librarians, faculty and students have agreed that the mission of the library is to provide needed materials in a timely manner, (i.e. right away.) The rub has been defining precisely what is needed. Since only the most general definitions are agreed upon, librarians traditionally have built very broad-based collections. For decades, libraries at well-endowed institutions sought the holy grail of the comprehensive collection, i.e. obtain and make accessible all recorded information. By the 1950's it was obvious that even

the greatest libraries would be unable to contain the ever expanding Information Explosion. By this period, libraries acknowledged the impossibility of any one institution collecting all recorded knowledge. In managing ever growing collections, librarians attempted to categorize and provide access to knowledge through the development of elaborate classification and cataloging rules, together with the compilation of a highly complex subject thesaurus. This manually-based system was prone to error and very cumbersome, both for library users and staff alike.

Starting in the 1960's, computers began to offer the first viable alternative to an unsatisfactory situation. It has taken two decades to begin to understand the true potential of libraries as they are enhanced by computers. Through their power, existing library collections become more accessible, purchase of new materials is more closely tailored to local need, and finally, library computer systems become windows or gateways to the balance of recorded information residing in other libraries.

N.W. Matheson[2] has identified the three "stages of adoption" regarding new technology:

Stage 1-The technology is used to do familiar and traditional things but much faster.

Stage 2-The technology is used for new applications and things are done that were never done before.

Stage 3-The technology is used in ways that change lifestyles and create changes in the fundamental mode of operation in institutions.

The Eastern Montana College Library is in the latter part of Stage I with some applications in early Stage II. From the point of view of library users, the integrated system is clearly Stage II with Stage III potential.

Eastern Montana College Library Automation: Current Systems Chronology

Eastern Montana College Library's utilization of computer systems commenced in late 1981 with the installation of Western Library Network (WLN) hardware. Successful conversion of manual operations within the library's technical services department was accomplished within a year. Soon after the introduction of WLN, the Library began its utilization of the campus computer system. Other applications followed. Staff now regularly employ at least four discrete computer-based systems.

Of particular interest vis a vis integrated library systems is our on-going data conversion project. Since 1982 we have been building a machine-readable file of our pre-1981 catalog records. Once completed, the project will provide us with the database for an integrated system.

E.M.C. Library Computer Systems

System	Installation Date	Utilization
Western Library Network (formerly Washington Library Network)	1981	Order, cataloging, accounting, data conversion, database construction and maintenance, interlibrary loan/electronic mail, statistics, database searching, library-use instruction.

Off-Campus Computer Systems	1982	Using library computer systems to "speak" with other computers located in New York and California in order to obtain information not available at Eastern.
Campus Computer Center	1982	Word processing, inventory control, list maintenance, statistical analysis, indexing
Kurzweil Reading Computer	1983	Voice-output computer which "reads" text to visually handicapped/dyslexic patrons.
Microcomputer	1985	Word processing, telecommunications, database searching, electronic mail, all tasks associated with Library's use of the campus computer center.

An End User System and its Benefits:

Thus far, virtually all library automation has concentrated on meeting operations requirements. Patrons cannot readily utilize these systems on their own. Physical accessibility of the hardware, awkward command language, paucity of user instruction and budget constraints all have played their part in restricting student and faculty use.

Technological advances have allowed the development of patron-friendly systems for libraries our size. These systems are proving themselves valuable additions on campuses throughout the country.

User Benefits

Access

Physical access to the index of library collections and eventually the actual text itself is not confined to the library building. Standard communication protocols allow dial-up access from sites on or off campus. Ideally, a campus local area

network or other communication system can allow existing campus dumb terminals and micros to access the library database. Such off-site access would not be affected by library hours that do not match the study and research habits of the students or faculty.

Search Strategy

Searching the library for required materials by harnessing the power of computers to review vast quantities of information is clearly an asset. Special features such as keyword searching and utilization of Boolean operators permit inquiries that are not physically possible to conduct with manual indexes. "Limit commands" allow the user to display information published during a defined period of time. Searches can also indicate specific languages. Thus, a system user could request a listing of all materials on a given topic published from 1978 to 1985 and exclusively in either English or French.

Status and Message Switching

An integrated library system would allow the patron to verify the location and inventory status of an item, i.e., is it on reserve, in the stacks or checked out? A student could "sign-up" for an item in use and be automatically notified upon its return. One could check to see if a favorite journal or magazine had come in yet or if the item is on order.

Other Advantages

-Integrated library systems through their standardized vocabulary allow for automatic linkages between the "correct" search terms and more colloquial terminology.

-Quick, error free check-out routines using bar-coded materials and library cards.

-Traditional card catalog functions such as author, title searches, combined with on-line "browsing."

-Potential for searching other Montana University System Library holdings as well as other regional and national collections.

While the panorama of user benefits is hard to fully define, clear advantages over the manual catalogs and indexes are apparent. Many other useful applications are being exploited by institutions with integrated systems.

Technical/Operations Benefits

-Integrated systems allow use of a shared database and therefore economize on required memory and disk space.

-Database maintenance is far more effective because of the ability of the system to effect "global changes" in records with inconsistencies or errors. Changing "subject headings" such as Ceylon to Sri Lanka

can be conducted with dispatch. Such maintenance routines keep the "catalog" constantly in touch with current accepted terminology.

-Potential reduction in costs associated with existing Western Library Network operations. Instead of using their database, (and being charged accordingly,) we would use our own database for certain functions.

-Online inventory control would automate various labor-intensive routines such as billing , "overdue" notification, and efficient management of the reserve collection. Such a subsystem would also allow a user to sign-up for "in-use" materials.

-Management information system reports can be generated by an integrated library system. Such studies would facilitate the development of more effective library services and collections. Being able to understand on a continuous basis which subject areas are utilized most heavily would allow the library to allocate its resources more appropriately.

Planning Issues: Spectrum of Concerns:

By no means an exhaustive list of topics, the following information should be useful at this stage of Eastern's consideration of library automation.

What is the Status of Other In-State Institutions Regarding Library Automation?

It is a fact that Montana's largest libraries are committed to acquiring integrated systems.

*Within the Montana University System, a modified budget request to fund library automation for the system failed to win support. Despite this, it is probable that the University of Montana and Montana State University will acquire integrated systems within the next 24-36 months. The potential for these systems to "speak" to each other, thereby increasing total library resource sharing remains unclear although it is likely that standard communication protocols would allow some form of access. It appears that the opportunity for developing a university-wide system has passed. Perhaps, in the future when several Montana University System units are contemplating system replacement, a coordinated planning effort will emerge allowing for greater resource sharing.

*Another state-wide effort at overcoming institutional barriers to resource sharing is the recent study issued by the Montana State Library Commission's Automation Committee. This report makes several important observations:

-A call for purchase of compatible hardware, especially within the University System.

-Indicates that the existing in-state integrated library systems utilize Digital Equipment Corporation hardware.

-Notes the relative paucity of technical expertise within the state and suggests remedies.

-Encourages the development of integrated systems which are shared between various libraries.

In summary, the State Library Commission Automation Committee report is a strong call for resource sharing and system compatibility.

Standards and Specifications:

While this section is somewhat premature, some basic parameters for an integrated system exist:

1) Where possible, adhere to "industry" standards. Use standard operating systems, common programming languages and telecommunication protocols.

2) Plan for a full array of potential communications options: phone, local area network, microwave, machine/machine, etc.

3) Anticipate patron demand for system growth. Adding more terminals, printers, and disk drives must not cause the obsolescence of existing system parts.

4) Software design must utilize a database management system to allow functional integration, preclude redundant disk storage and allow for running concurrent application software.

5) System design must incorporate maximum potential for networking and resource sharing.

Integrated Systems Marketplace:

The following enumerates significant existing library systems; including basic hardware requirements, vendor market share, and the number of installations.

NUMBER OF CUSTOMERS WITH INSTALLED AUTOMATED LIBRARY SYSTEMS

Turnkey Systems	New Systems Installed 1984	Systems Installed by end of 1984
Advanced Library Concepts	4	4
Biblio-Techniques	4	5
Blackwell Library Systems	4	4
Carlyle Systems	2	3
CL Systems , Inc.	19	228
Comstow Information Services	6	9
Data Phase	2	56
Data Research Associated	10	32
Dynix	15	22
Electric Memory	3	4
Gaylord Library Systems	6	19
Geac	25	93
H.C.E. Library Automation Systems	2	4

Innovative Interfaces Inc.	20	32
Library Systems & Services	3	46
MA/COM Sigma Data	7	18
OCLC	9	11
SCS Engineers	4	4
Sedna Corporation	0	1
SHL Business Systems	6	100
SIRSI	4	7
SOLINET	1	1
Sydney Development (Easy Data)	8	24
Universal Library Systems	3	30
Turnkey Totals	167	769
Library Developed Systems		
CALS Service Group	1	2
Dougherty County Public Library	3	3
Georgetown Univ. Medical Library	8	9
Northwestern University	7	19
Penn State University	1	2
Pueblo Library District	3	8
Tarrant County Jr. College	2	2
Virginia Tech	17	51
Library Developed System Totals	42	96

AUTOMATED LIBRARY SYSTEMS DEVELOPED BY LIBRARIES

System Name	System Supplier	Computer
Comprehensive Automated Learning System (CALS)	CALS Services Group, Ltd.	IBM 370
CLASSIC	Dougherty County Public Library	IBM System 38
Library Information System (LIS)	Georgetown University	DEC PDP 11/34

	Medical Library	
DOBIS/LEUVEN	IBM	IBM 370 IBM 4300
Rosemarie's Baby	Midland (MI) Public Library	IBM System 3 IBM System 34
Project for Automated Library System (PALS)	Minnesota State Univ. (Mankato State)	Univac 1100
NOTIS	Northwestern University Library	IBM 4300
Library Control System (LCS)	Ohio State University	IBM 370 IBM 4300
LIAS	Penn State University	Honeywell 66
Maggie's Place	Pikes Peak Library	DEC PDP 11/70
Univac Pueblo Library System (UPLS)	Pueblo (CO) Library District	Univac 90
Virginia Tech Library System	Virginia Polytechnic Institute & State Univ.	HP 3000
Technical Processing System	UCLA Research Library	IBM 320
Bibliographic Access & Control System (BACS)	Washington Univ. School of Medicine Library	DEC PDP 11
PHILSOM-Serials Management	Washington Univ. School of Medicine Library	DEC DPD 11/70

TURNKEY VENDOR MARKET SHARE

Market Share of New System Installed in 1984

Others.....37%

Geac.....15%

Innovative Interfaces..12%

CLSI.....11%

Dynix.....9%

DRA.....6%

OCLC.....5%

Sydney Development.....5%

Market Share of All Systems Installed at End of 1984

CLSI.....30%

Others.....26%

SHL Business...13%

GEAC.....12%

Data Phase.....9%

Library Systems & Services....6%

Data Research...4%[3]

COSTS

Volumes have been written on this slippery issue. However, there was one comment of overriding importance that emerged from the documentation reviewed. Those institutions that have installed integrated systems see that concentrating all of one's energies into precisely analyzing costs should not overshadow the primary issue which is the management of change. Computer systems change the way we "work" making cost-benefit analysis more difficult. Planning usually underestimates the need for system growth.

Other Important Cost-Related Factors:

*Planners are unsure about the costs associated with the management and maintenance of ever larger databases. This concern is especially

acute when trying to determine the impact of microcomputer workstations with powerful mainframe/database interface capabilities. End users appear to have an insatiable hunger for information. Pressure already exists for the development of full-text integrated systems. Such systems are capable of delivering the entire content of a document rather than just a brief description or abstract.

*We must be alert to rapid changes in price structures vis a vis hardware, software, telecommunications, and maintenance related sectors.

*Three classic cost parameters emerge:

a) Number of system users and their use patterns
b) Size and structure of database.
c) Desired system functions. For example, the option of subject searching using keywords may have significantly different hardware and software requirements than inventory control.

*Numerous other "... and don't forget..." items should be considered:

a) Disaster/backup systems.
b) System security/privacy issues.
c) System and database maintenance, including continuing education for personnel.
d) Ongoing funding of second, third generation systems.

Of course, the list must go on and begs the basic issue. The fiscal impact of integrated systems will be significant and such a burden is relatively heavier on small to mid-sized institutions. The costs are certainly of such a magnitude as to require exploration of every avenue of financial resource sharing.

The foregoing is a sample of topics which need to be analyzed by the academic community. Again, the most important hidden issue seems to be the management of change. Since the system is, technologically speaking, a new tool, we cannot be sure what the end-user will ultimately construct. An integrated library system, being end-user oriented, will be subject to strong pressure for enhancement.

This report has attempted to define the potential significance of an integrated library system for the academic community.

A planning process which culminates with the installation of a powerful end-user, computer-based system must address serious questions. Answers must make sense from student and faculty perspectives since they will be the primary customers of this new information service.

In the main, librarians consider resource sharing as their Golden Rule. For this reason, and for the potential fiscal advantages, it behooves Eastern to explore a shared system with other institutions. Significant library cooperation within Yellowstone County already exists. It is logical for Eastern to build upon this foundation. Doing so will assist us in meeting

our developmental goals while addressing identical concerns of the greater-Billings community.

FOOTNOTES

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